

Hobbies

WEEKLY

All correspondence should be addressed to The Editor, Hobbies Weekly, Dereham, Norfolk.

December 1st, 1948

Price Sixpence

Vol. 107 No. 2770

A SMALL MANDOLELE

AS the name implies, this stringed musical instrument is a cross between a mandolin and a ukulele. Readers who are conversant with both types of instruments will know that the mandolin has a set of eight steel strings, two of each being tuned in unison to give four notes, such as G, D, A and E, the same as a violin is tuned; one can play melodies on it, using a celluloid plectrum to obtain a tremolo effect.

The ukulele differs in that it has four gut strings tuned A, D, F-sharp and B on a piano (and various other keys). One can only "vamp" or harmonize on the ukulele, a felt plectrum being used to stroke the strings.

The writer has combined both instruments by designing a special body and incorporating four steel mandolin strings, i.e., a half set.

These strings, tuned to ukulele pitch, results in a sweet-toned melodious type of ukulele—in fact, a mandolele!

The Construction

A photograph of the actual model made is provided to show the slender neat, and novel appearance of the finished work. Odds and ends of scrap material, such as thin cheese box wood, margarine box wood, celluloid sheeting, etc., are used, and despite the fact that deal, with the exception of the walnut pegs and fingerboard, is the nature of the timber throughout, the mandolele is surprisingly sonorous, with a satisfactory tonal quality.

A front and side elevation appears at Fig. 1 to give a clear impression of the work. The alphabetical letters indicate (A) the handle head, (B) peg holes, (C) nut, (D) frets, (E) handle

support bracket, (F) finger-board, (G) the body, (H) sound hole, (J) bridge and (K) a dragon emblem.

The Body

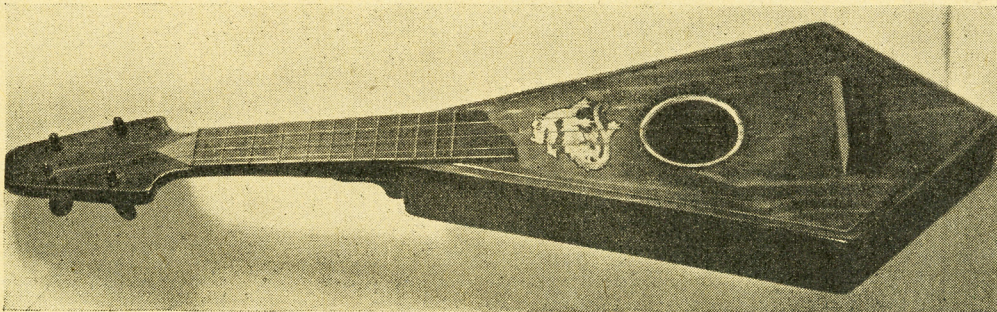
The body parts are prepared first. Back and front pieces are cut identical in size and shape from $\frac{3}{4}$ in. wood, a 2 in. diameter sound hole being cut in the front piece which, incidentally, should be straight-grained and free from ugly knots.

It is advisable to gauge an $\frac{1}{8}$ in. marginal line all round the edges, at the interior side of both shapes, then mark out the corner block positions (see Fig. 2). The blocks, when shaped and cut to length, are glued and pinned to the bottom, as shown, including the handle support blocking, further details of which are given at Fig. 3 (E).

The Handle

The handle has been designed to cut out unnecessary hard work in shaping from the solid. A piece of $\frac{3}{4}$ in. thick wood 11 $\frac{1}{4}$ ins. long by 2 $\frac{1}{2}$ ins. wide is wanted.

The top shape (A, Fig. 2) is marked



A Merry Christmas to all our Readers

out, then cut to shape with, preferably, a coarse fretsaw. Note, from the side view, that the head is 5ins. long and tapers to about $\frac{1}{4}$ in. at the end; the peg holes are $\frac{3}{16}$ in. in diameter.

Having checked the shoulder end as shown, the underside of the handle is rounded to the sections (Fig. 3) and then glued and screwed on top of the support blocking as indicated (E). It is imperative, of course, that the handle is truly in line with the body shape. If a central line is ruled down the surface of the handle and front body piece, the latter will, when set temporarily in position, enable you to look down the lines and draw the handle into alignment.

The Side Pieces

When the top shape has been secured, the $\frac{1}{8}$ in. thick side pieces

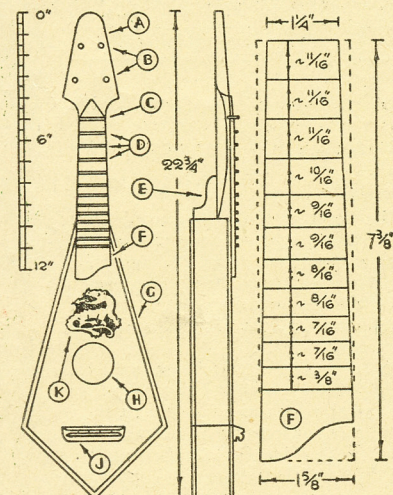


Fig. 1—Front and side elevation, with fingerboard shape and sizes

can be fitted and glued in place. Try to obtain neat mitre joints at the corners. When glued, the use of suitable clamps will hold the back and front firmly down on the side edges, otherwise thin panel pins or needle points may be used.

The nut is a piece of $\frac{1}{16}$ in. thick celluloid or bone, cut to the size shown (C, Fig. 2). Make a kerf for it with a tenon saw at the neck, i.e., 5ins. down from the top of the head, the depth of the cut being $\frac{1}{8}$ in. (see constructional details at Fig. 4), then fix in position.

The Finger-board

Regarding the finger-board (F), an enlarged view is given at Fig. 1, together with the exact fret positions. The wood is $\frac{1}{8}$ in. thick and should be planed true prior to shaping it to correspond with the handle.

The fret positions are marked off with a set-square, then saw cuts

made $\frac{1}{16}$ in. deep. When cut to shape, the finger-board is adhered neatly over the handle and fore-end of the body, keeping its narrower end close against the nut.

It is better to make the finger-board from a hardwood like walnut or even mahogany. Deal is too soft, and besides, it needs to be stained, whereas walnut or mahogany can be left in the natural state.

Bridge and Pegs

This also applies to the bridge (J) and pegs (B) as detailed at Fig. 3. The writer used whitewood in making the bridge and polished it ebony, and readers might care to follow this example.

Having shaped the bridge, make four knife nicks on the top edge $\frac{1}{8}$ in. apart, then drill or pierce four holes at a slant through the groove at the

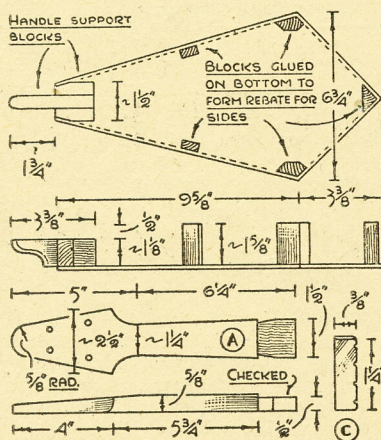


Fig. 2—Bottom with blocks in place handle shape and bone piece C

back for the insertion of the steel strings. The best way to anchor the strings is shown. The bridge may be

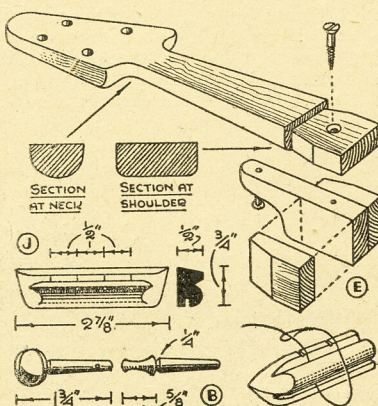


Fig. 3—Detail of handle at shoulder; piece J is bridge, B peg shape, etc.

adhered in position at this juncture.

Finishing Details

If constructed from deal, the finger-board can be fitted with the frets, then stained mahogany, including the rest of the work, excepting the front side of the body. Normally, brass fret-wire is fitted to the finger-board, but as this wire is difficult to obtain, one can make use of $\frac{1}{16}$ in. white celluloid.

Cut off $1\frac{1}{2}$ ins. by $\frac{1}{8}$ in. strips and glue them into the saw cuts. Level off the tops with a flat file and glasspaper. Projections at each side are cut flush and glasspapered, any sharpness at the ends being removed. The frets should project $\frac{1}{16}$ in. high, whereas the nut projects $\frac{1}{8}$ in. high.

Having stained the work as explained, apply a single coat of polish to the finger-board surface. The rest of the work is french polished in the usual way. The face of the mandolele should be kept in the white state and a coat of clear polish or varnish applied.

Fretted Emblem

Before doing so, however, the decorative dragon emblem (K) should be painted on the wood in black and silver. Pencil it on first, fill in with silver paint, allow to dry, then use black paint for the foundation. A black ring encircles the sound hole and the edges could be lined black.

Allow the finished instrument to stand aside for a few days before fitting the strings which, reading from right to left, are:—

- 1st string, very thin wire.
- 2nd string, slightly thicker.
- 3rd string, silver covered.
- 4th string, similar, but thicker.

If the thick silver-covered 4th string is used, it must be tuned an octave lower than the other strings. If a 1st string is used in place of a 4th one, it may be tuned in conjunction with other strings as shown at Fig. 4.

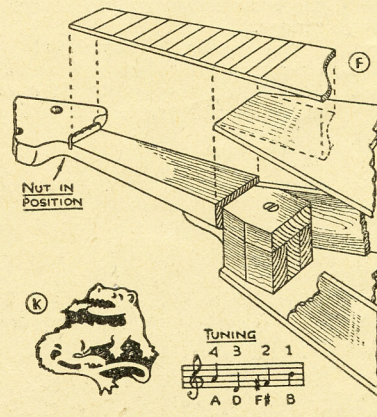


Fig. 4—Body detail at fingerboard, with emblem (K) and usual ukulele tuning

**This issue contains special Supplements of Xmas Gifts
Design Sheet and a Novelty Colour Calendar Picture**

Full instructions for building and completing a SIMPLE DOLL'S HOUSE

FEW presents are more pleasing to a young girl than a doll's house, and the one illustrated can be built for such a trivial sum that it is worth the little trouble to make it. It is of simple design so can be undertaken by almost any handy worker with confidence.

The foundation of the house is a grocer's box, the wooden type of course. One can generally be bought for a small sum, and should be about the following dimensions, 19ins. high, 12ins. wide, and 11ins. deep. Smaller or larger boxes could be used if the measurements given in the diagrams are suitably amended. The box, where necessary, should be smoothed with a vigorous rubbing all over with medium, and then fine glasspaper.

A Suitable Box

It may be desirable to drive in a few more nails to the joints, to make a sound job. The boards for the top of the box, which will be the front of the doll's house later, should be glued edge to edge and kept flat with a weight on top, until the glue is hard. At the same time glue across the front $\frac{3}{8}$ in. by $\frac{1}{2}$ in. strips of wood, one each at the top and bottom, and one across the middle, as shown by the dotted lines in Fig. 3.

The box being smoothed, cut a middle floor for it, from any thin wood available. This floor should have an opening sawn at, as at A, Fig. 1, to provide access via the stairs to the bedroom. The diagram, Fig. 1, by the way, shows how the box is fitted up before the details are added, and has one side of it removed to reveal the interior more clearly. Fix

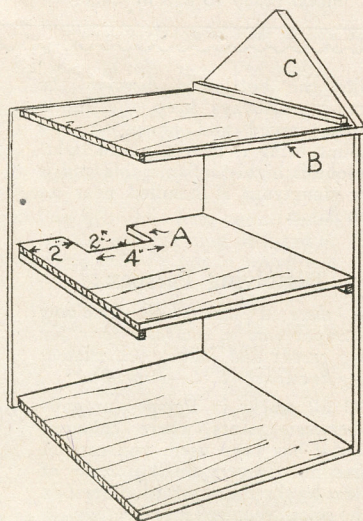
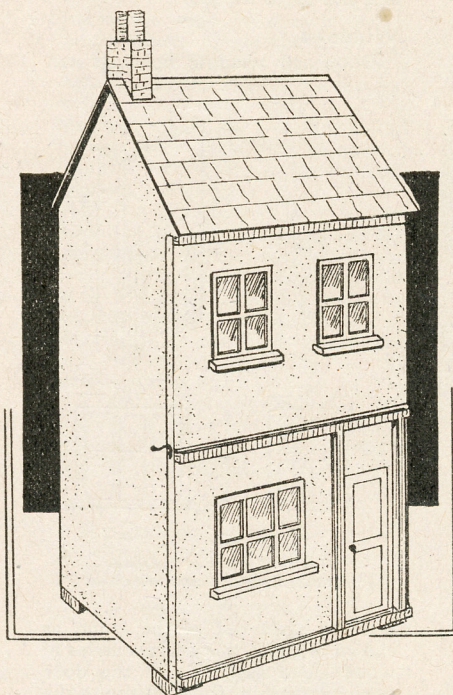


Fig. 1—General view of car case



the floor across the centre, gluing and nailing it to side fillets, as shown.

Across the front top edge of the box glue a strip of wood, B. This should be $\frac{1}{2}$ in. wide and the same thickness of wood as the front of the box. To support the roof cut two triangular pieces of spare box wood and fix to the top of the box, as seen at C.

Roof Supports

These should be the same length as the depth of the box, plus the strip, B, and have the sides cut to an angle of 45 degrees. They could be dowelled in place, or just fixed there with side fillets, as in the diagram.

The next part is the stairs and details pertaining to them. There are several methods of making up

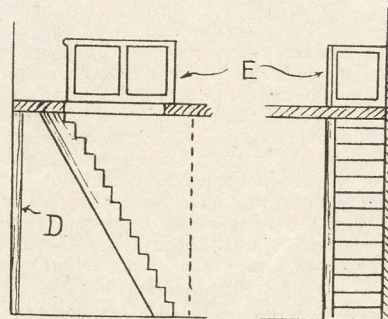


Fig. 2—Side and front view of stairs

doll's house stairs, and readers may choose their own, or adopt the following simple method. A front and side view of these stairs is given at Fig. 2.

Stairs

For the stairs a 2in. wide strip of wood, $\frac{3}{8}$ in. thick can be cut to fit between the two floors. This should be trimmed to 60 degrees, top and bottom, to bed down flat at the best angle. The diagram shows this. Now divide the strip into divisions of say $\frac{1}{2}$ in. each, as near as possible, and cut down on these lines to make the stairs. Fix in the position shown with glue.

The stairs should be boxed in with a piece of thin wood, or stout cardboard, which should extend from the wall to a little beyond the stairs, to about where shown by the dotted line. It can be securely fixed in place by gluing it to the stairs and to a strip of wood, D, nailed to the wall.

Handrails

Around the opening through the floor, some bannister rails should be fitted, as shown at E. These can be cut from fretwood and be fixed to the floor with glue and a few small nails. It will be found convenient to cut and fix these before fixing the floor in place. The rails will be fixed to the side and end of the opening, leaving the front open, of course. It may be added that the design of stairs shown is common to country cottages, and has been adopted here both for simplicity and room saving.

Two fireplaces can now be made from thin wood to the design shown at H, in Fig. 4. The method both of cutting to show a grate and the requisite projection is made clear in

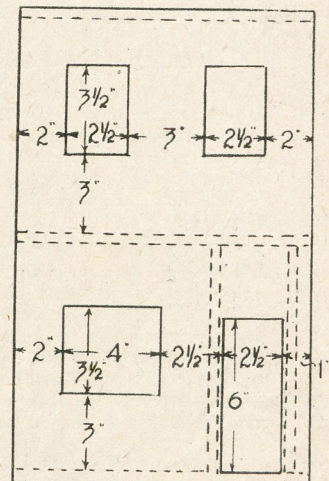


Fig. 3—How to mark and cut the main front

the drawing. These can be glued inside the house, in the centre of the left hand side. So far as the one is concerned that is made for the ground floor, it will be necessary to saw out a piece at the top to fit over the fillet on which the floor rests. This will be seen at once, when fixing in place.

Mantel and Grate

The mantelpiece and side grate strips are cut from any scraps of fretwood lying about and glued and nailed in position. Some care should be taken to cut the fitting the right length to fit tightly between floor and ceiling. This must be measured from the box as exact distances cannot obviously be given.

Cut the roof from cardboard, preferably in one piece, which can be cut lightly across the centre and then bent to the angle of the end blocks. C. It should extend over the eaves and ends about $\frac{1}{4}$ in., and can be glued and further strengthened with small nails. One or two angle blocks, cut to 45 degrees, might well be glued to the top of the box, say about where shown in Fig. 1, to fix the roof well down between the blocks.

The chimney stack is shown at I, and is cut from a solid piece of wood to dimensions given. Cut the bottom to 45 degrees, each way, to fit over the roof. The pots are pieces of $\frac{1}{2}$ in. dowel rod, or wood planed to that diameter if the rod is not handy. They can be fixed in place by boring $\frac{1}{2}$ in. holes in the stack, and then gluing the pots in the holes. Now glue the lot to the roof, $\frac{1}{4}$ in. in from the left side.

The Front Door

Now take the door in hand, which forms, of course, the front of the doll's house. This should have a strip $\frac{1}{2}$ in. wide sawn off the top and should then cover the box comfortably, coming just underneath the added strip, B.

It will be convenient at this stage to fit it to the box, with hinges, to open. Take care to hinge properly so that the front closes up against strip B, and does not drop. It shows bad workmanship when a door sags to one side and spoils the job.

Windows

Door and window openings can

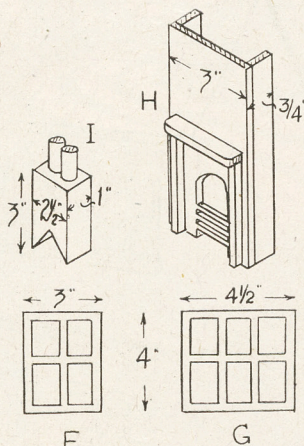


Fig. 4—Details of chimney stacks, fireplace and windows

now be sawn out of the front, as shown in Fig. 3, and narrow strips of wood glued each side of the door opening, reaching from the top to the middle strips glued across the front. The window overlays are shown at F and G, and are marked out and cut from thin fretwood. Being larger than their respective openings, they, when glued over, will form rebates behind for glass windows to be fitted in. Rhodoid, or any transparent material, can be fixed here in place of the glass, if preferred.

If the door opening is cut out with a fine fretsaw, the piece cut out can serve as the actual door. It should be fitted with small hinges.

To complete the work of construction, fix $1\frac{1}{2}$ in. square squares of wood to the bottom of the doll's house, one at each corner. These will raise the house a little, just enough to allow the front to open and shut freely and not scrape the table or floor.

Suitable Finish

The doll's house can be finished with suitable paper, both inside and out. The woodwork parts, doors, windows, etc. can be painted or enamelled any pleasing colour. Here there is scope for individual treatment, the main thing being to make a pleasing article, and if for a young child, there is no need to be too accurate about the details, such as the scale size of bricks and tiles for instance. A small catch should be fitted to the door and a strong hook fastener to close the front of the doll's house.

Those who would like to do a really economical job of decorating, can cover the interior walls with green wrapping paper, and the ceilings with white. Floors can be stained with any remains of oak or walnut stain handy. Outside, the roof and stack can be covered with paper, then stained with red ink. The bricks and tiles can be marked in in soft lead pencil, and a coat of clear varnish spread over the lot. The pots should also be stained red.

Paper Covering

The walls can be coated, if reasonably smooth enough, with tinted distemper. If you have not any left over from a job, make up a little with powdered whiting, size, and water, and tint with a little dry colour to cream, pink, or green, as preferred.

Instead of painting, as suggested, you can now obtain, quite cheaply, sheets of brick, tile, and interior paper from Hobbies Ltd., who also have realistic fireplace surrounds in metal ready to nail in place.

Repolishing a Table

I HAVE stripped all the polish from a dark oak Utility table, and wish to re-polish it light oak. At present the wood although thoroughly cleaned, is too dark, and I am undecided how to proceed. (B.L.—Wembley).

NOT an easy job, as the stain formerly used may have sunk in rather deep. Wash over the surface with oxalic acid, 1 ounce acid to a pint of water. Give it several applications and allow time for the acid to take effect. Then rinse with plenty of clean water and wipe over the surface with acetic acid or vinegar to stop the bleaching process, which otherwise may still continue. The wood can then be dealt with as usual.

Perspex Cement

COULD you give me any information on a strong cement for Perspex plastic glass and how to obtain it? (C.G.M.—Carlisle).

THERE are several makes of Perspex Cement now on the market, and as those are listed under a number of different trade names, it is difficult to recommend a particular brand, as this may not be available in your locality. All of these cements are, however, very similar and there is little to choose between them.

You could make your own cement by shredding scraps of Perspex into Acetone until the mixture assumes the consistency of syrup. Put the acetone into a small bottle, shred the Perspex in a little at a time and

shake the bottle to dissolve the Perspex. Always keep the bottle tightly corked and never on any account bring it near a naked light. Acetone is highly inflammable and is very dangerous if handled near an open flame.

Dissolving Perspex

IS there a means of dissolving Perspex into a malleable form for filling cracks and joints, etc., without losing its colour? (C.G.—Penrith).

TO fill cracks in Perspex or gaps between joints where coloured material has been used, you can, of course, make a very small quantity of cement by shredding scraps of Perspex of the colour required into Acetone.

For the bedside light or watchstand you should make THE ELECTRIC OWL

HERE is a novelty which should appeal to our readers who like making up electrical novelties. It is a night light having a box container for a pocket flashlamp battery, whilst above it sits an owl whose eyes consist of electric bulbs. By switching over a little lever attached to the top of the box these bulbs light up and give sufficient illumination to tell the time by a watch which could be laid on the top of the box or hung from a small hook on the breast of the bird.

The Box

The box is very easily made as the diagram Fig. 1 shows. The base is hinged to a frame, this frame having a top fixed permanently to it. The base piece is $\frac{1}{4}$ in. thick, while the other parts of the box are $\frac{3}{16}$ in. thick, and with a mortise cut in the top for the reception of the tenon on the owl upright and an opening for

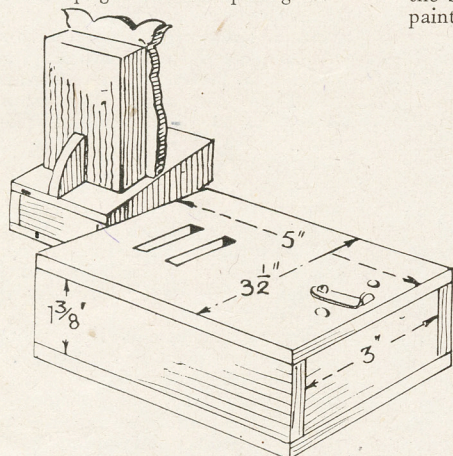


Fig. 1—General view of box base

the passage of the wires. The mortise is made 1 in. long and $\frac{1}{4}$ in. wide. Cut the various pieces square and glue and pin them together with fine fret pins.

To hold the base securely to the box after the battery has been put in and linked up with the wiring connections, a brass hook and eye may be fitted or two screws may be run in which can easily be taken out and replaced when a new battery is installed.

A squared diagram of the owl is given in Fig. 2 and this will enable the worker to make his enlargement of the bird direct on to the wood. On a piece of $\frac{1}{4}$ in. wood, therefore, measuring 5 ins. by 4 ins., run lines each way $\frac{1}{4}$ in. apart.

Draw the outline and feathers of the bird by following each square carefully and cut round the outline with the fretsaw. Also cut the holes

where the eyes come, but before cutting them, obtain the bulbs and see they only just pass through. At a distance of $\frac{1}{4}$ in. away from the owl upright, a second upright, A, is arranged and the threaded tail portion of the bulb must be screwed into this just as seen in the sectional diagram in Fig. 3.

A box-like casing is made of $\frac{3}{16}$ in. or $\frac{1}{4}$ in. wood to go behind the owl. In the diagram the back of the casing is shown as B, and the top of it as C. The back, C, could if desired be held in place by round-head screws, so that it can be easily removed in the case of any adjustments to the interior wiring, etc.

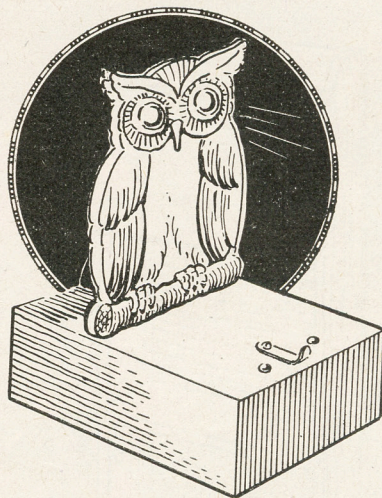
A complete view of the back casing is given in Fig. 4 and also shows the two connecting wires, B and C, which go on to the switches below.

Carved and Painted

The feathers, etc., on the front of the bird could be either carved in or painted on and afterwards varnished



Fig. 2—The "bird" outlined for drawing



strips of the battery and the fittings, C and D, of the box. To the back of the casing and immediately between the eye holes is fixed a piece of thin brass as, A, in Fig. 5.

The bulbs screw into this and complete the contact with C. Two smaller holes should be made in the brass strip, one to take a small round-head screw for fixing the strip to the upright, the other to take the end of the wire which runs down to connection C. The bulbs in Fig. 5 are shown ready to be screwed into A.

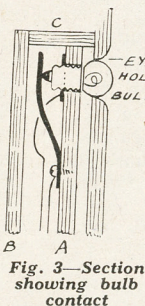


Fig. 3—Section showing bulb contact

To make contact with the extreme ends of the bulbs, two pieces of thin brass are bent up as at B in Fig. 5. These are about 1 in. long and are drilled at one end to take round-headed screws for fastening. Coiled round these screws are pieces of covered wire which should come together in the centre and

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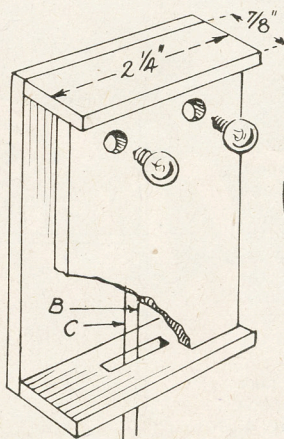


Fig. 4—The box with eyebulbs

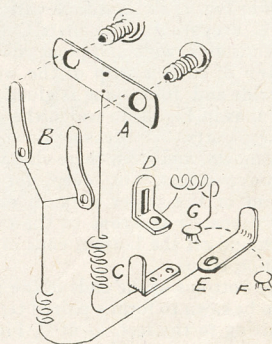
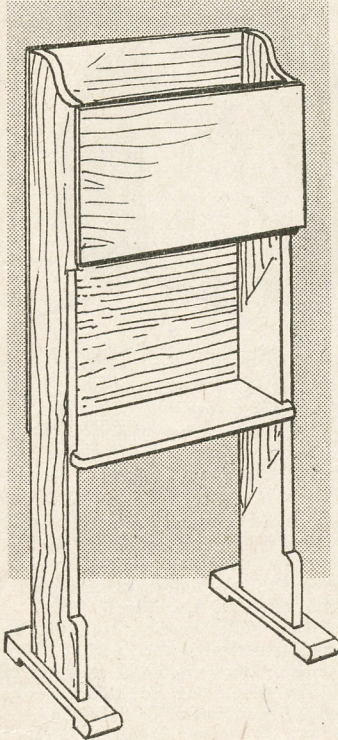


Fig. 5—Diagram of electrical circuit

over. The cut outline should also be painted and varnished over. The two sides and the top of the back casing of the owl should be glued on after the owl upright has been fixed, like this, the three pieces can be measured for convenience and neat joints made.

The wiring and the battery connections are shown in the diagram Fig. 5. The battery will be laid in the box so that contact will be made between plus and minus brass

Very little wood is required to construct this handy PAPER AND BOOK RACK



A VERY useful article of furniture this, for holding papers and magazines, with a shelf for the library books. It occupies little space, being intended for standing against the wall, and prevents the untidy appearance of such articles lying about on chairs and table.

It is made of wood, any kind, and requires comparatively a short piece of board, say $\frac{1}{2}$ in. thick, or $\frac{3}{4}$ in.; 9 ins. wide and 4 ft. 6 ins. long. Though timber is so scarce nowadays, it is generally possible to find such a short board from a piece of unwanted shelving, or from something no longer in use.

A front elevation of the rack is given in Fig. 1, and a side elevation in Fig. 2. Prepare the ends first. Cut the two ends 4 ins. wide and plane up. At the top of each a strip of the wood, 1 in. wide and 10 ins. long is glued and nailed, as in Fig. 3, to widen the ends at these parts. Measure down the 8 ins. shown, and from there chisel out a groove across, $\frac{1}{4}$ in. deep, for the bottom of the paper rack to enter. Now shape up the tops to the curve and round off the bottom ends of the glued-on strips.

The bottoms of the ends of the rack are to be sawn to form a pair of tenons for fitting to the feet, as at C, Fig. 4. Make these tenons 1 in. long, spaced 1 in. apart and as deep as the thickness

of the wood used. Now cut the groove across, also $\frac{1}{4}$ in. deep for the book shelf to enter.

Cut a piece of the board for the bottom of the rack 5 ins. wide and 12 $\frac{1}{2}$ ins. long, and make it a close fit in the grooves. Cut a similar piece for the bookshelf, but 12 $\frac{3}{4}$ ins. long. This, being 5 ins. wide, will project beyond the front just 1 in.

For the remaining 4 ins. of the width cut a piece away each end $\frac{1}{4}$ in. wide, for fitting in the grooves, as at B in Fig. 4. The shelf and bottom can now be glued and nailed to the ends of the rack. Use oval nails for this job, and punch them down below the surface, as they must be hidden with stopping afterwards.

The Feet

The feet are shown in detail in Fig. 4, C. They are 9 in. lengths of the wood, about 1 $\frac{1}{2}$ ins. wide, with two inch lengths of the same stuff glued below, one at each end. The mortises for the ends to fit in are cut 2 $\frac{1}{2}$ ins. from the back edges, allowing the ends to be 2 ins. from the back edges and 3 ins. from the front. Make these mortises a nice fit for the tenons, then glue only will make a firm secure fixing. The front edges of the feet are neatly rounded off.

Between the angle formed by the vertical ends of the rack and the feet, pieces of 1 in. wide wood, 3 ins. long, are glued and nailed in front. These are clearly shown in the elevations. Round off their upper ends. Now take the whole rack in hand, glasspaper all over smoothly, especially the upper curved edges of the ends.

The sharp angles of the side projections of the book shelf are slightly rounded off with a file. See the back and front edges of the

bottom of the rack are quite level with the side edges of the ends so that the boards to be used for making the sides of the paper rack can be bed down properly and make a close fit.

Boards for the back and front could be made from plywood, if any is to be got. Even tea chest plywood could be used if placed with the best side on view, for though it is of rather common quality a good rubbing down with glasspaper and a coat of stain and varnish will work wonders in covering up faults.

If no plywood is to be got, do not be tempted to use fretwood, supposing you are lucky enough to possess it, as any of the composition boards, now obtainable, will serve quite well and be good enough. Plywood substitute is quite suitable, in fact almost any of the wood substitute boards.

Two Panels

One board covers the back from the top to the book shelf, making a back both for the rack and shelf as well. A second piece is needed across the front to complete the rack portion. Both should, for preference, be screwed on, using no glue, and for appearance sake, screws of the round-headed variety should be selected for the front board of the rack.

The completed rack could be stained oak or mahogany colour, then receive a coat of varnish which, when dry, should be lightly rubbed down with a piece of worn glasspaper, and be completed with a final coat of the varnish.

The bare expanse of the rack front could be improved by the fixing of a suitable transfer decoration. This, if added, should be applied before the final coat of varnish, as the latter will protect and improve its appearance.

An alternative finish, and one that suits deal, is a couple of coats of paint, with a finishing coat of clear copal varnish, or one coat of flat paint and then a coat of enamel.

Apply all finishing stain or colour with care, as this will make all the difference to the finished article.

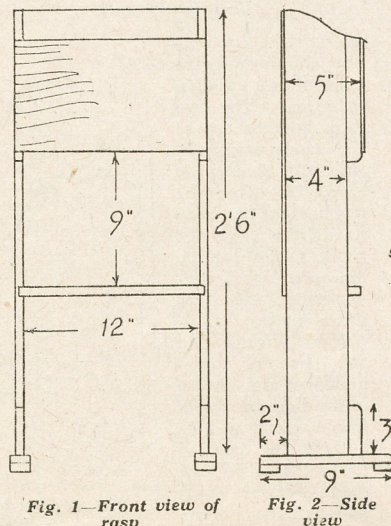


Fig. 1—Front view of
rack

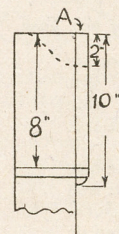


Fig. 3—Top
shape of side

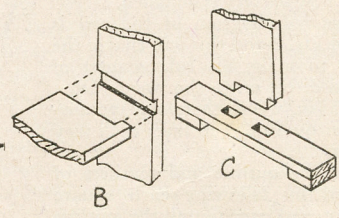


Fig. 4—Detail of various
joints

Quaint little toys can be made from our patterns of WALKING ANIMALS

HAVE you ever made a "walking" duck or rabbit? A design for these two popular novelties is provided in this issue (patterns on page 115), and needless to add, the toys are easily constructed, using a few pieces of wood, a fretsaw, and the usual handy tools about the home or workshop.

Wooden toys, with some form of action, always please the kiddies. The small rabbit, which the writer has devised, is a quaint realistic comical affair. It patters down a sloping board just like a real bunny, the large hind legs moving well up to the shorter fore legs and sending the wooden animal forward in short jumps, just like a real rabbit.

Regarding the duck, this is also fascinating to watch. It waddles down the board in a comical manner. Both novelties will amuse children for hours, and as only a few scrap pieces of wood are required, the toys are worth making as gifts.

An Inclined Surface

An inclined surface, such as provided by a board of wood is needed to operate the toys, of course. The board should not be less than 6ins. wide and about 30ins. long. The surface—and this is important—must not be smooth, otherwise the toys will merely slide down.

Accuracy Essential

Now, it should be explained at this stage that, although the novelties are simple to make and work easily, care is necessary in the construction. The edges of all shaped parts must be cut squarely—not at a slant.

For a brief second, you see, the body is tilted on the board. In that moment, it allows the legs to swing forward. If the supporting edge of the body is cut at a slant, the toy will be unbalanced and is apt to fall sidewise. This, however, is particularly the case when the body is cut from $\frac{1}{2}$ in. wood, and the legs from $\frac{1}{4}$ in. stuff. If you use this thickness of material and see that all edges are cut squarely, the toys will function without falling over sidewise.

It is better to use fairly thick wood, however, if possible. The body pieces are best cut from $\frac{1}{2}$ in. or $\frac{3}{4}$ in. wood, and the legs from $\frac{1}{4}$ in. or $\frac{3}{8}$ in. wood. This ensures a good "spread" in the width and toppling over on one side or the other is avoided.

Making the Duck

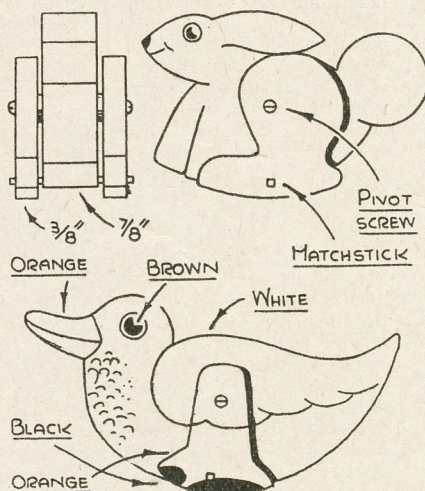
The duck could be made first. Trace the outlines of the body on $\frac{1}{2}$ in. or $\frac{3}{4}$ in. wood, using a sharp pencil and duplicating paper. Be sure to indicate the exact position of the pivot holes,

this also applying to the leg piece, two of which need to be cut out from $\frac{1}{4}$ in. or $\frac{3}{8}$ in. wood. The legs must be exact copies.

When the parts are cut out and smoothed with glasspaper, obtain two $\frac{1}{2}$ in. by 6in. roundhead brass screws and two $\frac{3}{4}$ in. diameter brass washers. These screws are for $\frac{1}{4}$ in. thick legs. If you use $\frac{3}{8}$ in. legs, get $\frac{3}{4}$ in. long screws.

Drill holes in the legs for the screws so the latter will be fairly free. If you bore $\frac{1}{4}$ in. holes, there should be plenty of freedom. The pivot hole in the body is made with a fretwork drill.

The legs are pivoted on the sides



How rabbit is made, with colour details of the duck

of the body with the screws. A washer should be between each leg and the body. The legs are not screwed tightly against the body, but left fairly slack to swing easily. The legs are connected at the bottom by means of a length of $\frac{1}{4}$ in. dowel or a piece of matchstick. Have the dowel or stick glued to the legs. Allow some slackness in the width between the legs so the legs swing freely.

Now test the novelty on an inclined board. A board, raised 6ins. at one end, gives sufficient incline to operate the toy. It should waddle down the board realistically. You will have to start it off, by the way, by rocking the body with the finger, or if the novelty is well made, it should start off on its own accord.

The Rabbit

The rabbit is made up similarly to the duck. In the constructional view provided, it will be seen that the body is cut from $\frac{1}{2}$ in. wood and the legs from $\frac{3}{8}$ in. wood. There is no need to stick to these particular

thicknesses. If you have $\frac{1}{2}$ in. or $\frac{3}{4}$ in. wood, use it for the body. If you have $\frac{3}{8}$ in. or $\frac{1}{4}$ in. wood, use it for the legs.

Remember, however, that the thinner wood means a tendency to top-heaviness, with over-balance, if edges are cut at a slant. Do not, in any way, depart from the original shape of the body. The rabbit's tail, for instance, may strike you as being somewhat large. The tail is really a counter-balance. If you reduce it, there will be no backward swing and the toy will definitely not work. An 8in. incline is needed for the rabbit.

Finishing the Novelties

Having made and tested the novelties, the next thing is to finish them. Generally, an oil paint or enamel is used. A drawback here is the length of time it takes for the finish to dry—and there is always some stickiness.

What is the best way to finish the toys? The best way, in the writer's opinion, is to use cellulose paint. The smoothed wood should be given a coat of flat paint which, when hard, is rubbed down with fine abrasive paper. This helps to seal the pores and leaves a smooth foundation for the finishing paint, which can be oil, enamel or cellulose paint.

Thin cellulose paint is the best stuff to use. The entire body of the duck is coloured white. Use a soft-haired enamel brush. When the application has dried (in about 20 minutes), it is rubbed down with 320-grade abrasive paper. The second coat is best rubbed on, like french polish. The rubber or pad consists of a ball of cotton wool covered with a piece of chamois leather.

The paint must be thin—1 part cellulose paint to 2 or 3 parts of thinners. The finish is rubbed on similar as french polish. It dries rapidly, however, and one must be quick, and also avoid rubbing too much in the one position. A smooth finish results, rather like the finish on pencils, if you take sufficient pains in the matter.

The legs of the duck need to be finished similarly, but with different colour, as shown. The outlines can be applied with a pencil brush, dipped in black cellulose paint.

Of course, if desired, you could apply the cellulose paint with a brush only. You must, however, have the first applications smoothed down with fine abrasive paper.

Regarding the bunny, it should be coloured light brown, with features and other details in black. Aim at simplicity.

Get ready for the Christmas Party by knowing some GAMES WITH PAPER

It is really surprising in how many ways those two simple materials, paper and cardboard, can help you to make a real success of your party. Thus it is sometimes necessary to pair off guests, as, say, for a competition or dance and to do this it is good to have ready a number of rectangles of stiff paper or cardette, each piece being roughly torn in halves by a jagged line. Old picture postcards would do admirably.

Keep the halves carefully apart and at the required time distribute the one set to the boys and the other to the girls. The fun then is for everyone to roam around and try to find their other half. For "breaking the ice" at the beginning of the proceedings this is an excellent scheme.

Portrait Identity

The game of "silhouettes" is great sport. This means the collecting of a number of large-sized portraits of celebrities from periodicals, which you ink in solid. "Silhouettes" is played by pinning the pictures around the room, when everyone tries to identify as many as they can in a certain time, say five minutes. Have a few silhouettes that are fairly obvious and a number that take some puzzling out. Pictures of film stars and characters should certainly be included.

The same idea can be worked with advertisements. Collect about one dozen of the fairly well-known advertisements and then with a razor blade cut out all names or other identification marks. The winner is the person who can correctly name the biggest number of the advertisements in a given time.

For a sit-down game people like to have things to handle, and a letter puzzle can supply quite a few minutes of diversion. Draw the capital, as shown, on a post-card and then with several cards together cut out with a sharp blade and afterwards cut up along the dotted line. Keep the sets separate with a paper clip and hand one to each player at the correct time. The aim then is to build up the letter, the winner being the one who completes his first.

Fish-waiting is great sport. For this you require four fish, as shown, cut out of thin paper. Laid on the ground it will be found possible to waft these forward by sharply waving a stiff piece of card behind them. The game is, of course, a race, the winner being the person who first gets his fish from the starting line to some predetermined goal. Make some fish to go with your other paper preparations.

Man on a String

A similar game is the "jumping man". To play this you must prepare two or three figures of men about 1 in. to 3 ins. from fairly heavy card. About three-quarters of the way up bore a hole and thread through about 12 feet of knotless string.

If one end of the length is now fastened to a chair rung and the other held, it will be found possible to urge the figures by a slightly jerking motion. The "race" lies in two or more players trying to get the figure to the chair first *without the feet ever*

leaving the ground. It is quite possible and good fun.

Have also in your box of paper gadgets a few rectangles of plain white paper. These are for such games as telegrams, composite drawing, consequences, etc.

Another excellent "paper" game is to collect a number of fairly large-sized pictures of film stars (those found in film periodicals will do very



Advert and silhouette games

well) the caption being cut away. The games organiser pins a picture on the back of each guest, the person in question not knowing which celebrity they are carrying.

The aim is for everybody to try and find out whose picture is on their own back and to this end the players intermingle and may ask six questions of every other guest to which the answer must be only yes or no.

The first player to get the name of their own star wins. A small prize adds zest to the game and things may go on after the winner has been discovered to give second and third places.

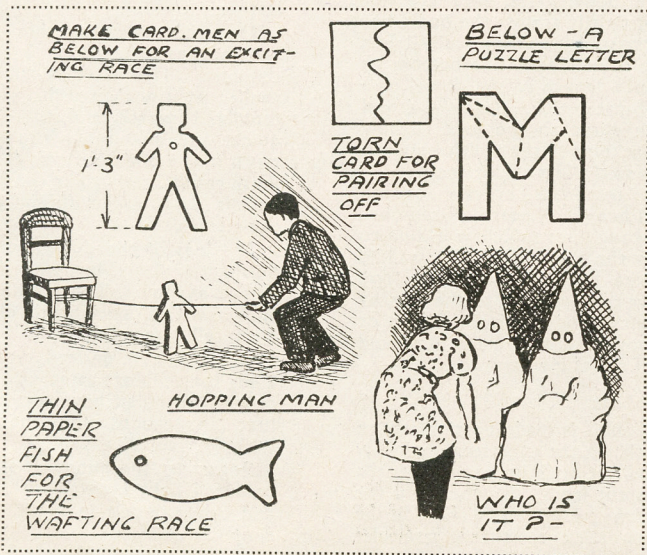
Recognition Game

Finally, make three fairly big "dunces" caps (really paper cones) with two eye-holes cut some way up from the rim. The hats are to go right over the head and face of an average-sized person so they must be quite large.

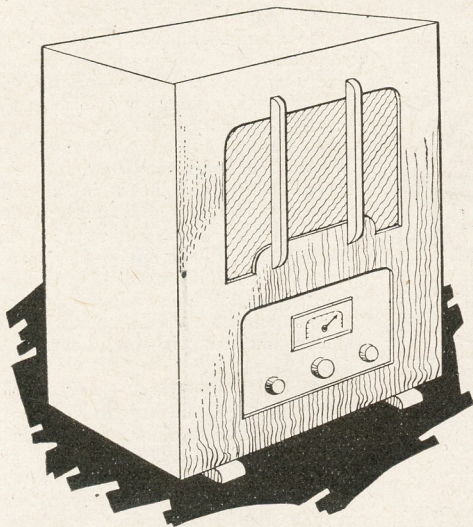
The game is in guessing who people are by their eyes alone. The victims sit enveloped in the cowl (in another room) with blankets or rugs coming up to the paper. The other guests are then allowed in one at a time and with, say, half a minute's look must say who the people are. Even if they know who is missing from the main room it is not too easy to say who is who of the cowed figures.

Well, there you get the idea of how useful paper can be in games, so start well in advance and have your box of surprises ready for when the great night arrives.

Remember that it is always advisable to work out a rough programme for your games, mixing them as much as possible. Do not have any last too long either, or the players will tire of them and become bored. Keep it all going with a swing.



Complete your radio set by putting it into A RECEIVER CABINET



THIS cabinet is so made that the receiver can be slipped in from the back and the panel of the receiver comes up behind a cut-out in the front of the cabinet. Therefore, almost any receiver can be accommodated and if it (or the control panel) is changed, the cabinet is not damaged or spoiled in any way.

Any ordinary loudspeaker can be used. Behind the speaker is a fairly large space with a shelf intended to hold the batteries used with a battery-operated receiver. With mains sets, this shelf is not needed.

The cabinet is quite straightforward, but has a modern and pleasing appearance. The radio constructor should find it well worth making to add the finishing touch to the set he has built.

The Cabinet Front

Fig. 1 shows the shape and di-

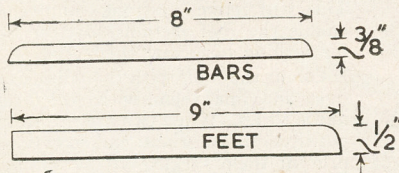


Fig. 2—Upright bars and feet

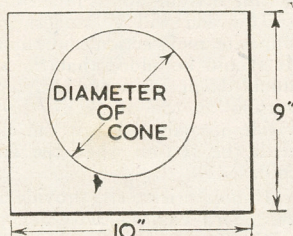


Fig. 3—Speaker baffle board

mensions of this. Mark the wood out carefully, using a compass set at 1 in. radius to draw the curved corners.

Good quality 3-ply is best, with the visible grain crossways if the wood allows this. Saw the two holes accurately and carefully, getting straight edges and smooth curves. When sawing is completed the edges should be glasspapered; fold the glasspaper round a block of wood so as to true up the straight edges.

Bars and Feet

The upright bars add considerably to the appearance of the cabinet. Cut them from 1/4 in. thick wood to the size shown in Fig. 2. Scraps of wood of a contrasting colour (or which can be finished off with a different shade to that used on the rest of the cabinet) are preferable. Glasspaper them smooth.

The feet (see Fig. 2 also) can be made by cutting two 1 in. strips from a 1/2 in. thick piece of wood. The flat ends will be fixed level with the back of the cabinet so that the curved front ends project slightly. Drill three holes through each.

They can then be finished off with a dark varnish, being screwed to the bottom of the cabinet with countersunk screws when the cabinet is finished.

Speaker Mounting

A piece of strong plywood is cut to the size shown in Fig. 3. The average moving-coil speaker is about 6 ins. in diameter across the cone, and this will require a 6 in. diameter hole. With smaller or larger speakers, adjust the size of the hole accordingly.

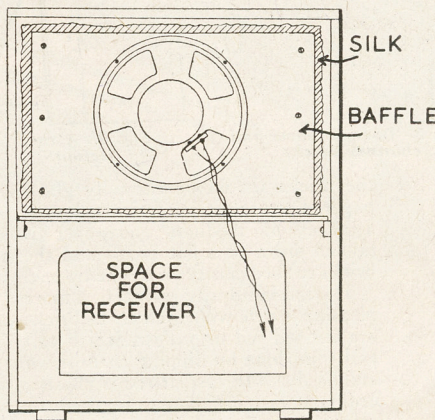


Fig. 4—Internal arrangement of cabinet

There is no need for the hole to be central. Actually, the batteries will probably go in easier if the speaker is a little to one side, and this will not harm reproduction in any way.

Building the Cabinet

To make a strong job, 3/4 in. thick wood is recommended for top, bottom, and sides. With wood of this thickness, the top should be cut 12 ins. by 8 1/2 ins. Each side will be 16 ins. by 8 1/2 ins. and the bottom will be 11 ins. by 8 1/2 ins. If required, a shelf

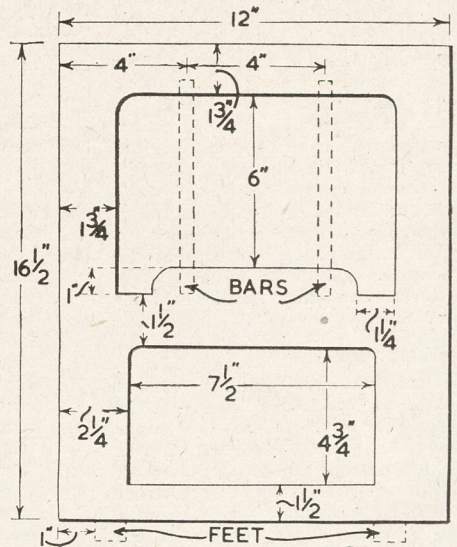


Fig. 1—Dimensions of front of cabinet

11 ins. by 8 ins. is cut from 3-ply.

Fig. 4 shows an internal view of the cabinet. Thin cabinet nails are used to secure the pieces together, and also to fix the front in position. The heads can be sunk slightly with a fine punch and the holes filled with plastic wood.

Do not fix the baffle, shelf or feet in place until after the cabinet has been thoroughly glasspapered and finished off with a medium glossy varnish. The feet should be a dark contrasting colour, and are screwed on from the bottom.

Inside Bars

The two upright bars should then be fixed on. They are screwed from the inside, one countersunk wood-screw being used at each end. Do not use large screws. The position of the bars is shown in Fig. 1 and small holes should be drilled to start the screws.

A piece of silken material about 9 ins. by 10 ins. should be strained over the inside of the cabinet so as to completely cover the speaker hole.

(Continued foot of page 108)

Any youngster will be delighted with a set of TOY BUILDING BRICKS

MOST children enjoy building something, and boxes of wood building blocks have long been a popular line in the shops. This is the kind of thing which any reader can well make himself for the amusement of his own children, and need cost nothing to make as any short ends of wood, useless for other purposes, can be utilised. Even if the reader has no such pieces of wood at home, a bag of these odd pieces can be bought cheaply at a timber yard.

As the set illustrated is primarily intended for a young child at the "kiddie" stage, let us say, the bricks are fairly large. Two lengths are suggested, one $\frac{7}{8}$ in. long and the other twice that length— $1\frac{1}{2}$ ins. long. If these are cut from $\frac{7}{8}$ in. planed board, and first cut in strips $\frac{7}{8}$ in. wide, the short bricks will be cubes, and can therefore be used any way.

A certain number of cubes, sawn diagonally across, are provided to finish the pointed gable ends of the buildings. All should be cut exactly to size as that fitting together becomes simple.

Marking the Strips

The first stage, having the pieces of board, is to mark a $\frac{7}{8}$ in. strip with the gauge. Cut off and plane to the gauge line. Then plane the edge of the rest of the piece and mark and saw off another strip. Collect a decent number of these strips, and then make up a cutting gauge for sawing the strips into bricks of both sizes.

Fig 1 (A) shows a plan view of the cutting gauge mentioned, with a detail sketch (B), showing its con-

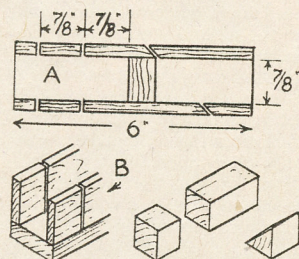


Fig. 1—Cutting trough and parts

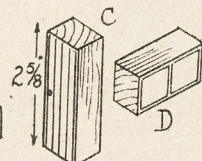


Fig. 2—Door, window and chimney blocks

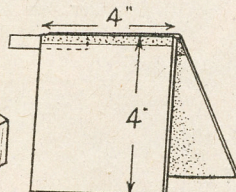
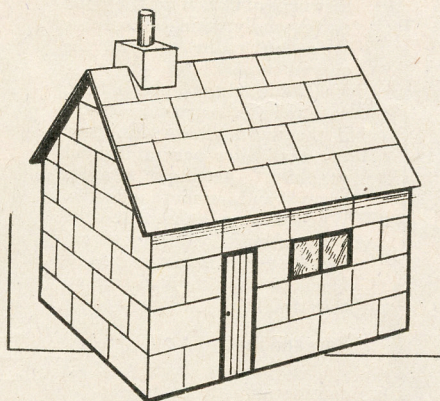


Fig. 3—A roof section



It is fairly obvious how the gauge is used. The strips are inserted and kept against the stop while being sawn across. Make a generous number of both sizes of bricks, as quite a number are required to build even a small house. The weakness of bought sets of bricks is invariably the insufficient number, causing some disappointment in "building" operations.

To gauge the cutting of the triangular blocks, set a bevel to 45 degrees, and mark the angle across the cutting gauge, seeing it exactly touches the stop, as shown at A. The triangular brick can then be accurately sawn, and should, if placed together in pairs, make a cube the same size as a small brick. The three sizes of bricks obtainable are shown, grouped together, in Fig. 1.

Finish and Colour

No need to cut an abundance of the triangular blocks, a comparatively small number, say 12 to 18 will most likely be found sufficient. When cut,

the bricks should be carefully glass-papered smooth, a job quickly done if a sheet of medium glasspaper is pinned down to a flat board and the bricks rubbed gently on it, one by one.

Though in no way essential, a more pleasing article will result if the bricks are stained red or yellow, which can easily be done by dipping them in an aniline dye. In fact, if red is chosen, ordinary red ink could be used to colour them.

Fig. 2 shows other items, door, window, and chimney stack, necessary additions for building a model house. The door, C, is a strip of brick size, but as long as three small bricks, as shown. The door is defined by painting a border strip at sides and top. The space between can be painted any other colour and lined in pencil, vertically, to represent planking.

Item D shows a window. It is just large brick size, and outlined to show up the window panes, the latter being painted on a blue colour. Both window and door are, of course, solid blocks, and fit in with the bricks.

Doors and Chimneys

Two doors should be provided and, say, an equal number of windows. One small brick, outlined and painted to represent a one-pane window, could be added, as many cottages include such a small window at the rear.

The chimney stack, E, two of which may well be included in the set, is a small brick with a piece cut out underneath to fit over the roof. Bore a $\frac{1}{8}$ in. hole through the centre of the brick, and glue therein a round bit of wood to represent the chimney pot. Stain the pot red and the rest the same colour as the bricks, if it has been decided to colour them at all.

Roofs must now be made up to complete the set. It is suggested that the roofing be in two or three sections, to cover different sizes of model houses, as any kiddie will wish to work some variety in his building operations. Fig. 3 shows one section.

It is composed of two pieces of cardboard cut to the dimensions given. Lay them flat, edge to edge, and glue over the joint a piece of tape to act as hinge. When dry, close the two together and glue a second piece of tape over the joint on the outside. This will make a strong joint and enable the roof sections to close up for packing away with the bricks.

Colour the roofs with the red ink or dye, and line them with pencil to imitate tiles. When two are placed in position on the bricks, end to end, to prevent them sagging in the middle, glue a strip of thin card in one section, letting it stand out as in the diagram.

This end will go underneath the opposite roof section and support it. It should be added that the strip is doubled lengthwise and is glued to the section at the angle of the ridge, inside of course, then it can close up with the section when the latter is folded.

To hold bricks, etc. provide a small cardboard box, so that they can be safely put away after use,

How to prepare, hang and colour the strings of FANCY XMAS LIGHTS

THERE is, no doubt, that the use of strings of coloured lights are very popular for parties and similar occasions. Children welcome them with pleasure, especially when they are used in otherwise complete darkness, as when on a tree at Christmas.

Once made, a string of lights can be kept for use year after year as occasion demands, and it is the purpose of this article to describe how such lights may be connected up. Operation from batteries or mains is

current consumption is five times as great.

Transformer Operation

A mains transformer with a low voltage secondary (used for driving model motors, etc., or employed in radio sets), is ideal for supplying power to a string of lights in parallel. Such an arrangement is shown in Fig. 1.

The great advantage is that a high voltage is not connected to any of the lamps. If the transformer secondary is for 4 volts, torch bulbs may be used. The easiest manner of connecting is to take a length of twin flex and bare both strands at 2ft.

should add up to, or exceed, the mains voltage. For example, lamps adding up to, say, 270 volts, will be satisfactory on 240 to 250 volt mains, but lamps adding up to only, say, 200 volts, should not be used on 240 volts.

Torch Bulbs, etc.

All sorts of bulbs may be used in Fig. 4. Car lamp bulbs are cheap. Nine 6 volt bulbs would add up to 54 volts; with a 200 volt main-electric bulb added; the whole could operate from 250 volts.

Any bulbs may be used provided they all pass the same current, as mentioned. If the current is not

known, it may be found by dividing the voltage of the bulb by the wattage. For example, a 6 volt 6 watt car amp will consume 1 amp. A 12 volt 6 watt lamp will consume $\frac{1}{2}$ amp., and so on. Some manufacturers mark their torch bulbs, which are usually .2 or .3 amp., 2.5 or 3.5 volts.

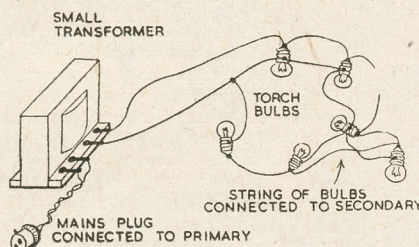


Fig. 1—Small bulbs in parallel

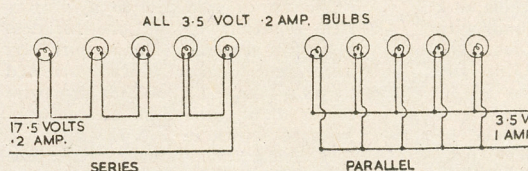


Fig. 2—Example of series and paralleled connection

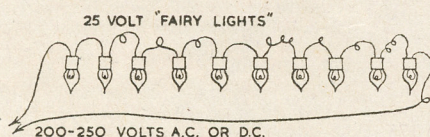


Fig. 3—The circuit for direct mains use

possible and the most convenient system should soon become apparent.

Series and Parallel

Before going on to describe actual fittings it should be remembered that a number of bulbs may be connected in one or two ways, as Fig. 2 illustrates.

In series connection all the bulbs are wired in series. This means that the voltage required to work the full string will be the voltage of all the lamps added together. When bulbs are wired in this way it does not matter what their working voltage is.

For example, lamps of 6 volts working can be connected in series with 12 volt lamps, or even in series with 100 or 200 volt lamps, and so on. But all the lamps must pass the same current. If they do not, some may light weakly (or not at all), while others are too brilliant.

Same Voltage Essential

In parallel connection the voltage of all the lamps should be the same but the current need not be the same. Fig. 2 shows how the different way of connecting exactly the same bulbs makes a totally different power supply necessary. 17.5 volts is needed in one case, with 3.5 volts in the other. But in the latter case, the

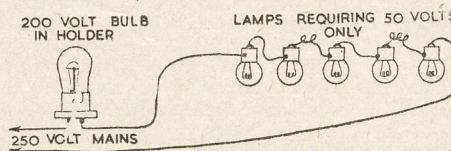


Fig. 4—Making use of a ballast bulb

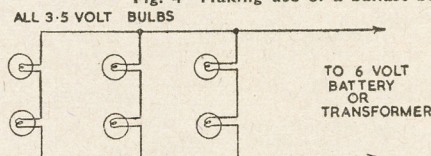


Fig. 5—Diagram of series-parallel connection

intervals. The bare places should only be about $\frac{1}{4}$ in. long and the bulbs may be soldered directly to the wire.

As many bulbs as are desired may be added, provided that the total amperage does not exceed that of the transformer secondary (e.g.—10.2 amp. bulbs would be the maximum for a 2 amp. transformer). It must be remembered that transformers cannot be used on direct current mains.

Series Lights

Fig. 3 shows a series circuit. This shows how bulbs are added until the necessary voltage is made up. Ten 25 volt lamps add up to 250 volts, which is suitable for 200 to 250 volt mains. Some shops can supply lamps specially made for this purpose.

If the small lamps do not add up to the mains voltage, then a large lamp may be used to rectify this, as in Fig. 4. It will be found that the total voltage is not critical, but the lamps

Series-Parallel

For battery or transformer operation it may be convenient to arrive at a certain voltage. Bulbs may then be connected in parallel in series of two or three, and so on. Fig. 5 illustrates this. If more bulbs were needed they would be added in pairs. Actually the two 3.5 volt bulbs will add up to 7 volts, but a 6 volt supply will be ample.

With a little thought almost any bulbs can be wired up to total approximately the voltage of any transformer or battery it is desired to use.

Battery Operation

For battery operation, wiring is extremely simple, but the number of lights will be limited by the current taken. If an accumulator is handy this is most suitable, and a moderate-sized one will operate ten or a dozen small bulbs easily. It is usually most convenient to wire all the bulbs in parallel.

Bulbs should be chosen which consume a small current. Some cycle lamp bulbs for the rear light consume only .06 amp. Ten in parallel will then consume .6 amp., and this can be supplied by one of the larger cycle lamp dry batteries.

For shorter periods of use, ordinary torch bulbs can be used, but a dry battery will not last long when working several of these together.

(Continued on foot of page 109)

You can get much fun if you make for yourself AN ELECTRIC BUZZER

NUMEROUS uses for this buzzer will immediately come to mind.

It may be used instead of an electric bell; it can be used for practice in learning Morse, or used for signalling. With two buzzers connected at a distance, two-way communication can be arranged.

It will operate from any small dry battery and none of the constructional details is in any way critical.

The Electro-Magnet

It is probably best to wind this first. An iron core is necessary and there are many ways of making this up. A piece sawn from an iron bolt about $\frac{3}{8}$ in. in diameter is suitable, or a bundle of iron wires or iron nails with the heads removed can be used. The length should be between $1\frac{1}{2}$ ins. and 2 ins.

Two cheeks about 1 in. in diameter are fitted to the core so as to make the bobbin shown in Fig. 2. They can be a tight fit, glue helping to hold them secure.

The bobbin is wound almost full with 22 to 26 S.W.G. wire. If enamel-covered wire is used, brown paper should be wound round the core between the cheeks before putting on the wire. The S.W.G. is not critical and for 2 to 3 volt operation 16 or 18 S.W.G. wire can be used. Put several layers of paper over the

completed winding. If the ends of the wire are taken to a battery, the core should become strongly magnetized.

A strap cut from tin secures the bobbin to a baseplate about $2\frac{1}{2}$ ins. square. Two round-headed screws are best, as these can be tightened until the bobbin is firm.

The armature piece should be about $\frac{1}{4}$ in. wide and $1\frac{1}{2}$ ins. long and it is cut from thin sheet iron or a tin can. (As the latter is rather thin it should be doubled into two or three thicknesses). The armature is bolted or soldered to a springy strip—brass is best, but one thickness of tin can be used. This strip is then fixed to a bracket which is screwed to the base so that the armature comes about $\frac{1}{4}$ in. from the magnet pole, as shown in Fig. 1.

A contact screw bears on the free end of the springy strip. This screw should be filed to a blunt point and it is fixed to its bracket by means of lock-nuts so that it can be adjusted easily. Its position will be seen from Fig. 1. The point of the screw will need to be at about the same height as the centre of the magnet.

Adjusting and Using

One end of the magnet winding

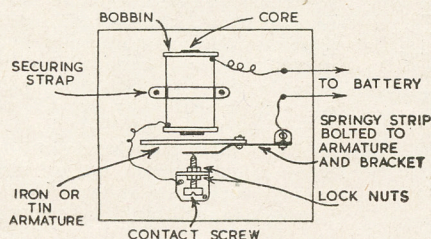


Fig. 1—Plan view of buzzer parts

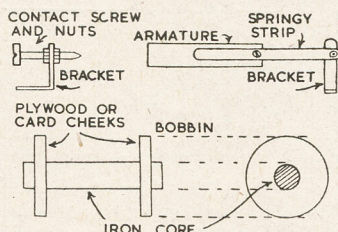
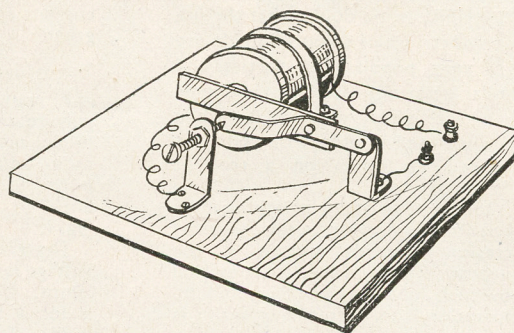


Fig. 2—Details of bobbin, etc.



should be connected to the bracket holding the contact screw. The other end is taken to a screw or terminal from which flexible leads can be carried. A second screw or terminal is wired to the armature bracket.

The armature should bear back against the contact screw. Any note from a powerful high-pitched buzz to a low drone can be obtained by varying the distance between armature and magnet, and altering the strength with which the springy strip bears against the contact screw.

For Signalling

For signalling, a Morse or tapper key must be wired in series with the battery. If the buzzer is used instead of a door-bell, the bell-push would be wired in the same way. A voltage of about 2 to 6 is most convenient.

The completed buzzer may be fixed inside a box or tin, the latter providing the greatest sound. If a suitably sized tin with a lid can be found, this may be screwed up where required with the buzzer inside, the leads passing through a small hole. If the whole is painted or enamelled, the final result will be quite as neat as can be desired.

Receiver Cabinet—(Continued from page 105)

Glue or pins will hold it secure and the squares of material made specially for this purpose are best from the point of view of appearance. A golden brown colour which tones with the cabinet should be chosen.

The speaker should now be screwed or bolted to the baffle board. Because of the vibration the screws should be really tight and washers may be added.

The baffle and speaker are now inserted in the cabinet and fixed by six or seven small woodscrews. Take care that the latter are not long enough to penetrate right through the front of the cabinet. The silk will now be held securely between the baffle and cabinet and will not

come loose or pucker into odd creases.

The Shelf

This rests upon two strips approximately 8 ins. by $\frac{3}{4}$ in. by $\frac{1}{4}$ in. These strips are screwed on to the sides of the cabinet from the inside. Use three or four screws in each strip so that the weight of the batteries can be withstood.

It will be found most convenient to leave the shelf loose so that it can be lifted out when inserting the receiver into position.

Receiver and Back

Four short screws driven through the receiver panel from the back will hold the panel tightly up against the

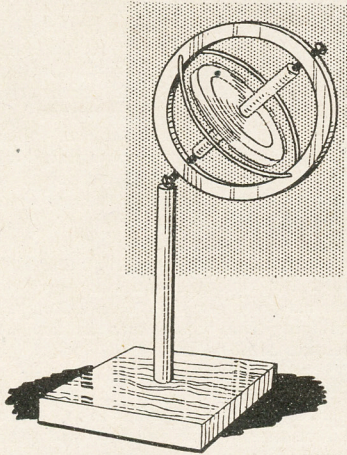
lower cut-out of the cabinet and prevent the set moving when in use.

If a back is made to exclude dust it should be 12 ins. by $16\frac{1}{2}$ ins. It can be held in place by small catches or any other convenient means.

To prevent muffled or echo reproduction, the back should have a row or two of $\frac{1}{4}$ in. or 1 in. diameter holes, to permit sound waves to escape. With mains receivers, one row of holes should be near the top, with a second row near the bottom, so as to permit a free circulation of air to reduce heating.

To allow aerial and earth to be connected easily, drill $\frac{1}{4}$ in. holes in the back level with the aerial and earth terminals on the set.

There is nothing really difficult in making A SIMPLE GYROSCOPE



THE simple gyroscope shown herewith can be made almost entirely from scrap material, but if a little care is taken in the construction, the result will be an interesting and instructive toy.

Commence by making the wheel, A, Figs. 1 and 2. On a piece of $\frac{3}{16}$ in. wood—plywood if possible—draw a circle 2ins. in diameter. Use compasses to draw this article, as the mark made by the compass needle will indicate the exact centre and ensure that the wheel runs true. Cut the wheel out carefully with a fretsaw.

Lead Rim

The wheel has now to have a lead rim cast around it. To do this, cut two more discs, B and C in Fig. 2, from $\frac{1}{8}$ in. wood, making them $1\frac{1}{2}$ ins. in diameter. Drill a fine hole in each of the three discs, exactly at the centre mark left by the compasses, and taking great care to keep the drill vertical. Join the three discs together with a fine $\frac{1}{16}$ in. nail, the largest disc, A, between the two smaller discs, B and C, as shown in Fig. 2.

For the mould use two pieces of scrap wood. The upper piece, D,

Fig. 2, should be $\frac{1}{16}$ in. thick; the thickness of the lower piece, E, does not matter. Cut a hole $2\frac{1}{2}$ ins. in diameter in D, then draw a circle $2\frac{1}{2}$ ins. in diameter on E. Nail or screw the two pieces together, taking care that the hole in D, is exactly over the circle marked on E.

Now take the wheel and with a file or penknife, make four small notches at equal points around the edge of disc A. This will give the lead rim a grip and prevent it from turning round on the finished wheel. Use the nail in the discs to secure them in the mould, being careful that the point goes into the mark left by the compass needle. Do not hammer the nail down hard, as you will have to remove it again.

Melting

Melt some scraps of lead in a ladle. If you have not got a ladle, a small tin fitted with a handle will do. Pour the lead carefully into the mould until it is level with the top disc, B, of the wheel. When cold, take the wheel from the mould and remove the nail and the discs, B and C, which may now be scrapped.

Next enlarge the centre hole in the wheel until it will take a piece of $\frac{1}{4}$ in. diameter dowel rod a tight fit. Cut the dowel rod 2ins. long and secure it with a touch of glue, taking care that the rod is vertical in the wheel. Test it by spinning between the fingers, and if there is any "play", correct it before the glue sets.

The pivots are gramophone needles inserted into each end of the dowel rod, point outward. Drill a hole first in the exact centre of each end of the rod and about $\frac{1}{16}$ in. deep. Grip the needle with pliers, being careful not to damage the point, and force it into the rod until only $\frac{1}{16}$ in. projects.

The gimbal ring, G, which carries the wheel, is cut from $\frac{1}{8}$ in. hardwood to the measurements given in Fig. 1. At two opposite points in the ring make $\frac{1}{8}$ in. diameter holes to take the pivot sockets.

For the sockets, get two $\frac{1}{8}$ in. by $\frac{1}{8}$ in. round headed brass Whitworth screws. Drill a very small hole in the end of each screw to take the pivot point. A fretwork drill will make these holes quite well, which need only be $\frac{1}{32}$ in. deep.

Assembly

Enter the screws into the holes in the gimbal ring and drive them in with a screwdriver. If the holes are sufficiently tight, the screws will cut a thread in the wood as they go in, which will secure them and also allow for adjustment. Place the wheel in position and tighten the screws until it will spin freely, but without shake. A spot of oil on the pivots will help.

If desired, a guard ring to protect the wheel may be added. This is a

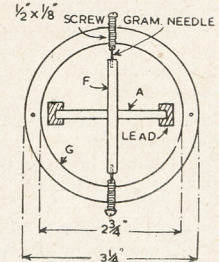


Fig. 1—Size of parts

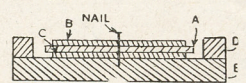


Fig. 2—Section of wheel frame

completed gyroscope should be painted in bright coloured enamels. A simple demonstration stand, as shown in the illustration, may be made from a piece of rod fixed in a wooden base 4ins. square.

To spin the top, take a piece of thin cord and give it a couple of turns round the dowel rod, then pull smartly. The top may then be placed on the stand at any angle and will remain in this position as long as the wheel continues to spin.

Xmas Lights—(Continued from page 107)

With low-voltage operation there is no chance of shocks and any small holders may be used, or the bulbs can be soldered directly to the wire.

But with mains-operated lamps, care should be taken. Good twin-flex should be used and moulded insulated bulb holders. All joints should be secure so that they will not pull loose and no bare ends should be left which anyone might touch.

A switch can be added in the circuit at any convenient point. The

pear-shaped switches intended to include in the run of wiring are convenient as they do not require fixing down.

If the lamps are naked they should be coloured in a variety of hues. Thin paper, tissue, Cellophane, or coloured varnishes may be used. Bright reds, pinks, greens, yellows and light blues are best as dark, heavy colours are ineffective.

Where one large bulb is used, as in Fig. 4, this may be covered with

coloured paper and placed at the foot of the Xmas tree, or otherwise contribute to the effect. Remember that high wattage, high voltage lamps become hot after a period of use, so that paper should not be close to such bulbs.

Variety in the form of hanging lanterns, coloured paper shades, etc., are possible and quite simple to contrive. The handyman should be able to arrange something suitable without much difficulty.

The amateur photographer should make this handy PHOTO PRINT GLAZER

A GLAZER and drier for prints is a very handy accessory for photographers to have. Here is how the amateur can make one for himself. Unlike most of its kind, the glazer described is constructed of wood. The prints, however, are squeegeed on to the usual chromium or stainless steel plate which, of course, does the actual glazing.

As will be seen by the sketch, the general idea is of a box with electric bulbs burning inside to give the necessary heat and with a plate holding the prints across the top, the latter being covered and held firmly by a canvas "apron".

Non-Sticking

Prints will never stick to either stainless steel or chromium (as they often do to glass) and either type of plate will serve the purpose. But stainless steel is better in the long run, as in time chromium dressing is apt to get rubbed away, and prints certainly will stick to the metal below.

Stainless steel, being of the same material throughout, never loses its surface, no matter how much it is cleaned.

Both types of plate can be obtained through photographic dealers in several sizes. For the amateur, however, and for use in the wooden glazer described here (in which the plate is flat) the smallest size, 10ins. by 15ins. is the best.

The box is constructed from two end pieces, 16ins. by 6ins. (assuming a 10ins. by 15ins. plate is being used), two sides 9ins. by 6ins. and a base 15ins. by 16ins. Side and end pieces should be of $\frac{1}{2}$ in. wood, but the base can be thinner. From the middle of each end-piece a circular hole is made to hold a standard electric bulb socket.

Cross Strips

The most important sections of the box are the strips (A). These are shaped as (B) with a "step" (b) across each extremity to fit over the end pieces and a step (d) $\frac{1}{4}$ in. wide down the whole length, and just the depth of a glazing plate.

The side strips should be dead flush with the top edges of the ends, and form with the ends a complete all-round support for the plate.

The strips (A) can be quite deep and are held in position by screws going into their ends from the side. The thin layers (g), however, should be continued over the ends and be held by sprigs as this makes it possible to use the plate for glazing purposes to the very end.

If all has gone well a perfectly flush

top should now be presented when the plate is in position, as shown in the "cut away" sketch.

Apron Piece

The "apron" (T) can now be fitted. This is a length of fairly stout calico, 15ins. wide, and of sufficient length to wrap round from side to side, over the top of the box and plate, as indicated in the bottom right-hand diagram.

At one side the material is attached to the wood by a series of small screws going through a fold, but at the other a metal rod (h) passes through a tunnel of cloth formed by turning a short length back and stitching.

Another rod (k) (a length of old metal stair rod will do) is now attached by the two coil springs (p).

The second rod when pulled over catches under the two screws (m), things being arranged that when it is so caught the springs are under tension, thus holding the canvas tight.

Finally, two ordinary electric light sockets are fitted into the hole in the

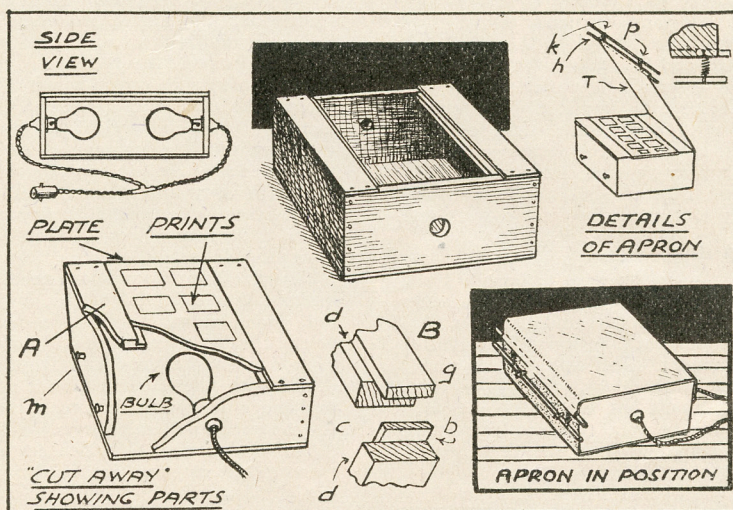
glazing in general. The main factor when getting the prints on to the plate is to exclude every bit of air from between the surfaces. This is the idea of "squeegeeing", but even the squeegee has to be used correctly.

First the prints must be taken straight from the water and placed on to the plate (the very best thing is to float them on). They are then covered with a cloth, laying it on without creases or rucks. Now holding the cloth and plate together at one side take the squeegee and roll over the surface from the side you are holding, covering the whole area in as few strokes as possible.

One Way Only

Always work the roller in the same direction, not first one way and then another. This is most important.

If the prints have not been in perfect contact with the plate you will know by seeing areas of dull emulsion surrounded by a general higher gloss. If the dull areas are very marked,



side (top left-hand sketch) and wired together so that they can be run off one household plug. The bulbs employed need not be of great power, 50 or 60 watts being sufficient.

Procedure

To use the glazer, the plate is removed and the wet prints squeegeed on to its surface. It is now replaced and the apron brought over and clipped in position.

The lamps are then switched on and in a short time it will be found that the prints are perfectly dry and glazed. The box, of course, will get very warm, as well as the plate, but not dangerously so.

Now, just one or two points about

there has been definite air bubbles imprisoned.

In all cases of poor glazing the print can be re-soaked and the process done all over again. The plate itself should of course be kept well wiped, using some very soft material for the purpose. On no account use any cleaning preparation as neither stainless steel or chromium need these things.

HOBBIES 1949 HANDBOOK

68 Pages—Large Model Coach
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A unique occasion marked a service of HOBBIES THANKSGIVING

DEREHAM, Norfolk, as most readers know, is the centre of industry where much of the popular tools, machines, and materials of Hobbies Ltd. are made. Dereham is, also, geographically, almost in the centre of Norfolk. During the late war this was certainly not an enviable position, for it was surrounded by airfields in a county which contained more acres of runways than any other part of the country. The railway was a centre of three radial lines serving the surrounding country, and the factories and offices of Hobbies Ltd. stand astride the main line.

The danger of enemy air attack was therefore obvious, particularly as virtually the whole output of the firm at that time was for important and essential Government requirements. Naturally, air raid warnings and civil defence activity had to be a part of the scheme of things, and equally naturally it was called into play as frequently throughout the war as anywhere in the country.

There were well over 1,000 alerts on the town sirens during the war—sometimes three and four a day. Work at first had to be stopped frequently, but a special system of localised danger warning soon reduced these periods and the 24-hour day and night shifts continued.

In spite of almost daily sound of bombs dropping in and around, however, the town was indeed fortunate in suffering little damage—although a wing to the house of the Managing Director was badly knocked about. Incendiaries strung out down through the station on one occasion, but almost miraculously nothing even fell on the acres of ground covered by factories and offices, and no single casualty was sustained by any of the personnel due to enemy action.

Such an escape was surely a great cause of thankfulness, and it was with this in mind that the Chairman of the Board of Directors, Mr. Richard Jewson, J.P., a former Lord Mayor of Norwich and President of the Timber Trades Federation, suggested a suitable service could be arranged, as a Thanksgiving Jubilee Service for the preservation of personnel and works from enemy attack. And it met with enthusiastic support from the whole of the employees on an occasion which will long be remembered by every one who took part. It was perhaps

the more appropriate as coinciding with the 50 years of progress of the firm and its Jubilee events which have already been mentioned in these pages.

A Packed Church

Towards the end of September a special Thanksgiving Service for employees was held in the centuries-old Parish Church, and although it has a capacity of over 1,200, there were large numbers who could not get seats, but had to fill the back of the church and even the porch. The local band of the British Legion accompanied the singing, which was led by a mixed choir of works employees. A special form of service was printed and an outstanding feature was the hearty singing of the well-loved hymns. The service was conducted by the Vicar, Rev. Noel Boston, M.A., F.S.A., and ministers of the other denominations took part.

The Directors were present, as well as a number of the Urban and Rural District Councils. An inspiring and appropriate address was delivered by the Vicar who stressed the need for the spirit of service, that we might not waste the fruits of the sacrifice of those who had laid down their lives in the war.

Tea and Entertainment

After the service the whole company went to the Vicarage meadow where an enormous marquee had been erected so that nearly 900 could sit down to tea. A tasty and sufficient meal was provided for all, with a range of substantial and dainty edibles. The scene of such numbers at one sitting enjoying the repast, was

an unforgettable sight and one which must have been sufficient recompense to the Directors for their thought and arrangements.

Speeches

After tea, on behalf of the Chairman's brother, the Vice Chairman (Mr. Frank Jewson) expressed the hope that "something of the same kind may happen in another 50 years". He added, "Throughout the whole of the firm's existence the directors have had the loyal and unswerving support of the employees and without it the firm would not have been in existence today. The continuance of Government contracts after the war testified to the quality of the work done by all employees". There were three cheers for the Chairman, who had made a long journey to be present despite ill-health.

On behalf of the employees and pensioners of the firm (a number of whom were present), Mr. R. Moore, assistant engineer, thanked the Directors for their generous and enjoyable effort, and this was received with loud acclamation.

Afterwards a very enjoyable entertainment was provided for all sections. A Punch and Judy show enthralled the children, a first-class all-round B.B.C. entertainer (Mr. Bert Bradshaw) gave an excellent programme for the adults, and the British Legion Band rendered several items of music.

Altogether an outstanding occasion worthy of the great name of Hobbies, and one which will long be remembered by all those who enjoyed taking part.



Employees outside the huge marquee prior to the tea

Some practical advice by an expert on KEEPING PET MICE

HERE are a few interesting hints for those who keep pet mice, which will, undoubtedly, appeal to our younger readers. The pastime is inexpensive, and the ways of the little animals quite fascinating.

Feeding

Be sure to have a regular feeding time. Many fanciers feed their pets once a day, in the evening. For adult mice, get good quality oats, with a little wheat added. For growing youngsters use Quaker Oats and/or coarse variety of oatmeal.

For seeds, provide them with best white millet and a little linseed. For soft food, use stale bread soaked in hot water. Squeeze out all surplus water and add a little milk, which must be fresh. Or you can use one or other of the foods for mice that are advertised.

Perhaps for your purpose it will be advisable to feed morning and evening. Morning meal, say, scalded bread and milk added to each doe nursing young, about 1in. cube of bread being sufficient for each doe; other stock is not fed in the morning.

Evening Meal

For evening meal, give all stock the bread and milk, and to the adults also give whole oats; for the young ones Quaker Oats or oatmeal. Twice a week give just a few seeds of white millet to each mouse along with the oats, and once a week a little linseed.

Keep all feeding pots clean, and do not allow uneaten bread and milk to taw overlong in the cages, especially in hot weather.

If possible, keep your mice in a suitable shed or outhouse; if not possible, use an indoors room, preferably the attic or any spare room. It is better to have an outdoor mousery, but though almost any sort of outbuilding will do, it must be free from damp and draughts.

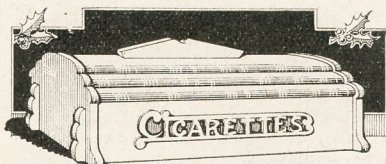
Cages

A good size for an outside mousery is a wooden shed about 7ft. by 5ft. and 6ft. high, with a door at one end and a window to open at the other. It should be built well off the ground, on bricks, to allow air to pass under.

for the mice to pass in and out from run to compartment.

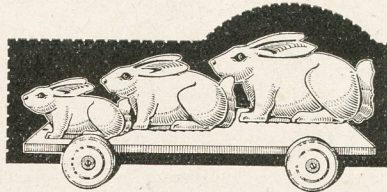
At the end of box bore two 1in. diameter holes and cover with perforated zinc from the inside. For the lid, make a frame to fit the opening at top of box, leaving the end pieces to overlap the width of the wood at each end, so they rest on the end of the box to hold lid in position. Cover the lid frame, from the inside, with perforated zinc. Give the inside of box a coat of distemper.

For a breeding cage the measurements should be about 14ins. by 8ins. by 6ins. high. Partition the nest



Besides these two practical presents, this week's enlarged design (No. 238 Spec.) contains patterns for three novel "doggy" Calendars. Wood for making Toy Rabbits, Cigarette Box and two Calendars is supplied with all date pads, wheels, hinges, etc. for 6/5 or 7/2 post free

Designs for making 5 Xmas Presents



However, any small shed will be suitable provided it is dry and not draughty. You can easily make cages for your pets or you can buy them from makers who advertise in the papers.

Get a few empty boxes or packing cases. About 4ins. from the end of your box, inside, nail a piece of wood from side to side, but not quite the depth of the box, this to partition off a sleeping compartment. Allow a hole 3ins. square at bottom of partition

part off 4ins. by 8ins. and leave a hole for the mice to run from outer compartment to the nest. Sawdust should be laid down in the run, and soft sweet hay placed in the sleeping compartment. It does not matter if the mice eat some of the hay; indeed, it is good for them.

Whatever you do, be sure and keep your cages scrupulously clean. When cages have been used for some time, scrub them out with a little disinfectant in the water.

Electric Owl—(Continued from page 101)

then lead down to the battery below. The diagram, Fig. 3, shows clearly the brass pieces and their wire connections.

Coming down now to the box where the battery is installed, it will first be advisable to remove the base from the hinges so the correct positions for the contact pieces may be ascertained and marked out. Lay the battery centrally on the inside of the base and note where the two pieces of strip brass come from it.

Next angle up two pieces of thin brass as, C and D, Fig. 5. Each may be cut as D, so the battery strips may be pushed in and held tightly or they may be plain just for contact only as C. Put these two pieces on the base, and screw them in place, afterwards connecting one of them up with one of the wires from the bulbs, allowing a little spare wire for ease in handling.

Now take in hand the box portion, and to the top fix two brass studs. These may consist of ordinary paper clips, F and G, Fig. 5, just pushed through holes and turned down. The studs should be placed 1in. apart. Centrally with the studs and 1in. higher, screw on a lever formed of stout brass, shaped and turned up at one end as E, Fig. 5. This is the contact lever and to its fixing screw must be brought the other wire from the bulbs.

The Lever Switch

By switching the lever from the "off" stud, F, on to stud, G, contact is made, the circuit completed, and both bulbs lighted. To hold the battery firmly in place, two small blocks of wood may be glued on, one each side of the battery, and small hooks run into the tops. Over the

battery stretch an elastic band, this will hold the battery steady and in place.

Those pieces of loose wire which allow for the opening and closing of the box, are coiled and laid near the battery, and the top box portion replaced and screwed to the base. Two coats of clear varnish should be given to all the wood parts including the base.

It should be noted that the size of the battery box is such that it will hold comfortably a double-cell dry battery such as is used for an ordinary cycle head lamp, or the smaller square flash-lamp battery. If the former is adopted for use, then some little modification of the contacts in the box must be made from that shown. That is, a flat contact strip will take the place of the angled piece, C, in Fig. 5.

MISCELLANEOUS ADVERTISEMENTS

The advertisements are inserted at the rate of 3d. per word prepaid. Name and address are counted, but initials or groups, such as E.P.S. or £1/11/6 are accepted as one word. Postal Order and Stamps must accompany the order and advertisements will be inserted in the earliest issue. Announcements of fretwork goods or those shown in Hobbies Handbook are not accepted. Orders can be sent either to Hobbies Weekly, Advert. Dept., Dereham, Norfolk, or Temple House, Temple Avenue, London, E.C.4

100 STAMPS free, enclose 3d. for approvals, state age and favourite countries, many free sets.—G. Roberts, 59 Gledhow Park Grove, Leeds 7.

2 POLAR Flight giant pict. (cat. 1/3) — 9d. 5 Spanish American lge. Air pict. (cat. 1/7) — 1/- List of packets, sets, singles free.—G. Pearce, Wheathill, Burwarton, B'north, Salop.

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PLYWOOD. We can supply sound plywood tea-chests 24ins. by 19ins. by 19ins., at 5/- each. Del. approx. 1/6 extra. Panels are ideal for model making, etc.—Universal, 91c, Mora Road, N.W.2. GLAdstone 9994.

GREAT free gift. Bahawalpur. Brilliant unused large Bicentenary Commemorative stamp in two colours (black and carmine) depicting head of the Ameer set against ornate oriental background. Printed in England early this year, it is already valued at over eight times its face value. This very beautiful Indian Native State stamp will grace any collection, and is given free, until supplies run out, together with four other interesting stamps, to all applicants for approvals that offer a wonderful selection of stamps at a fraction of catalogue value. Postage to—Richard Turnbull, 4 Gt. Bedford St., St. James's Square, Bath.

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STAMPS FREE !! Twenty unused (2½d.)—H. G. Barnett, Limington, Somerset.

“MODERN Wood Toymaker”, a new handbook with 180 effective designs and illustrations—2/6 posted.—Industries, 2 Waldegrave Park, Twickenham.

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50 SCALE Model Houses wanted. Firms or individuals with small scale Model Houses for sale, or who possess materials and facilities for making, detached and semis to ½ in. and ¾ in. scale, from plans supplied, are invited to communicate with Box No. 234, Hobbies Weekly, Dereham, Norfolk.

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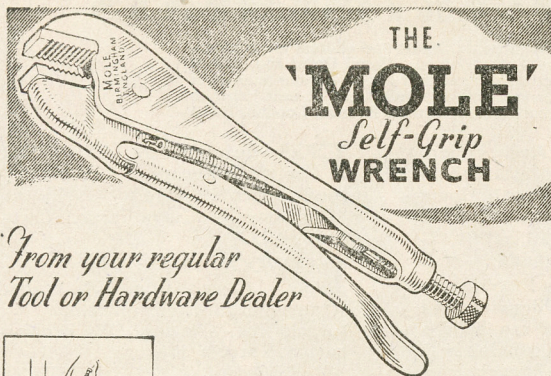
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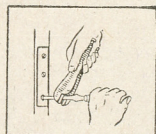
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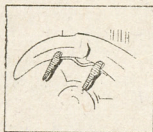


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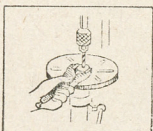
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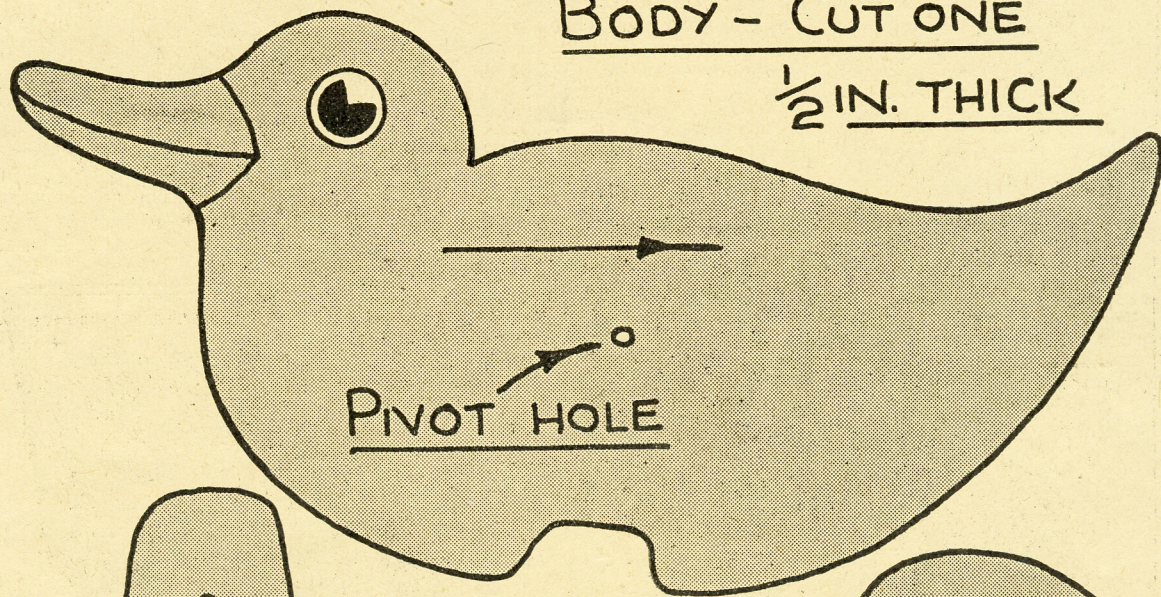
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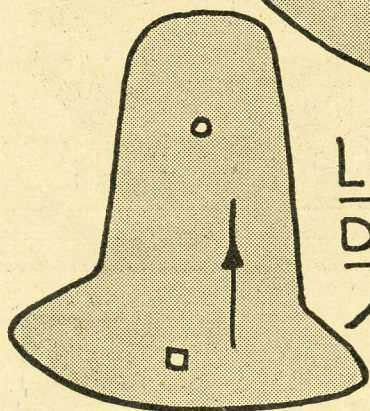
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Tel.: REGent 1411

BODY - CUT ONE

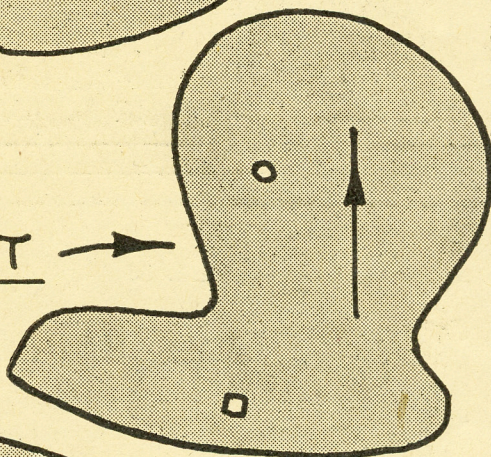
$\frac{1}{2}$ IN. THICK



LEG OF
DUCK

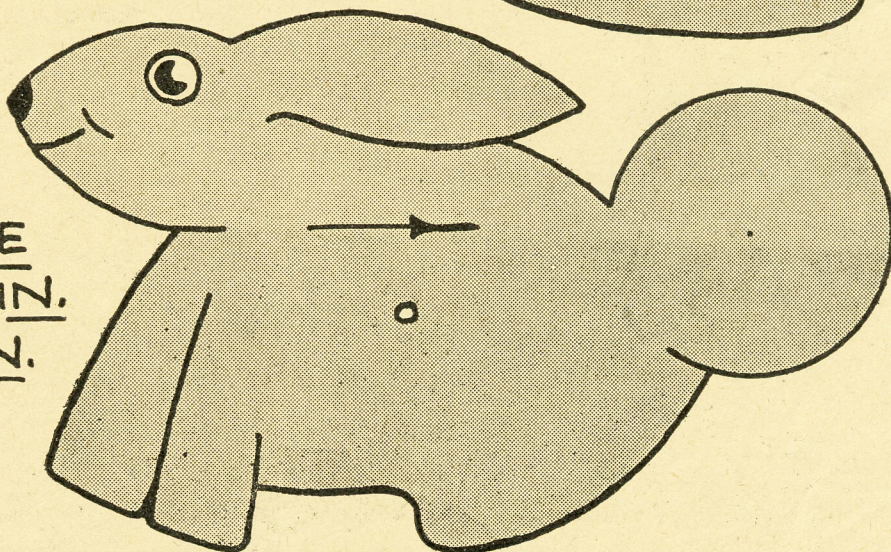


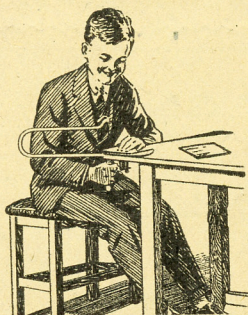
RABBIT
LEG



BODY

CUT ONE
FROM $\frac{1}{2}$ IN.
OR $\frac{7}{8}$ IN.
WOOD.



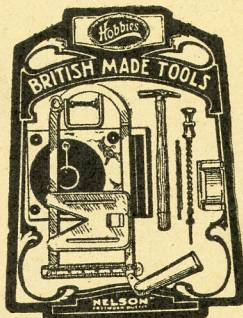
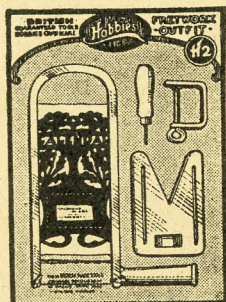


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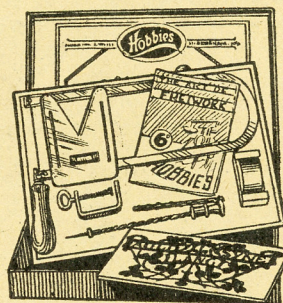
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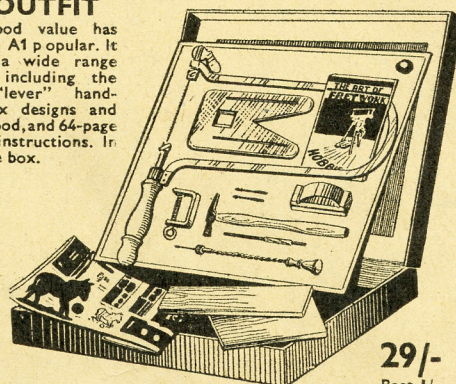
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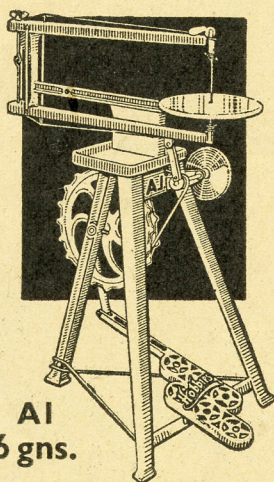
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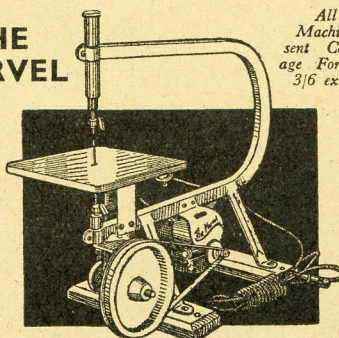
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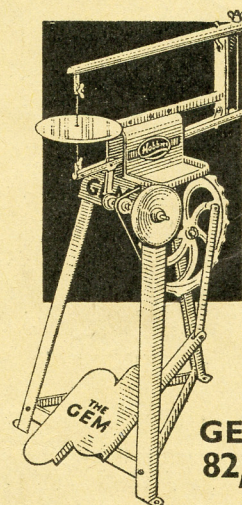
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